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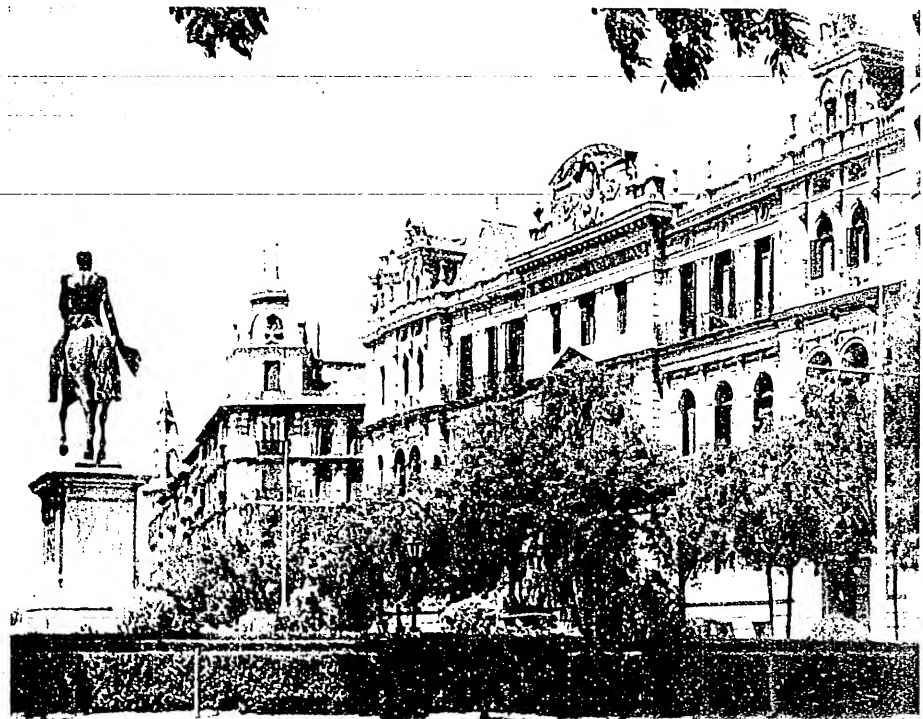
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•JUAN DE LA CIERVA• FOUNDATION
FOR TECHNICAL RESEARCH

ITS ORGANIZATION
AND DEVELOPMENT

MADRID, 1950

Approved For Release 2003/08/11 : CIA-RDP80-00809A000500080191-9



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ITS ORIGIN, AIMS AND ORGANIZATION

THE Patronato JUAN DE LA CIERVA de Investigación Técnica (Juan de la Cierva Foundation for Technical Research) forms part of the «Consejo Superior de Investigaciones Científicas» (Higher Council for Scientific Research) and is responsible for all scientific work of a technical and industrial character. It is vested with complete independence in the performance of its tasks.

The Foundation was established by the Law of the 24th November 1939, which created the Council itself. It was set up as a part of the Higher Council with the aim of applying the results of technical and scientific research to the development and independence of national resources, thereby placing the organization of science and technique in the forefront of the nation's problems.

To achieve this end it has been given the following organization: A President, a General Secretary and a Governing Body, as executive organs; a Technical Advisory Council and Special Technical Advisory Committees as consulting bodies; and the Institutes and Centres of Research, which are entrusted with the actual task of scientific and industrial investigation.

GOVERNING BODY

It is upon this body that the government and administration of the Foundation, together with the responsibility for the adequate development of technical research, depends. Its head is the President of the Foundation. The remaining members are the Vice-President and the General Secretary of the Foundation, the General Secretary and the Comptroller of the Highe

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Council for Scientific Research, as well as a small number of delegates representing the scientific and economic activities of the nation.

TECHNICAL ADVISORY COUNCIL

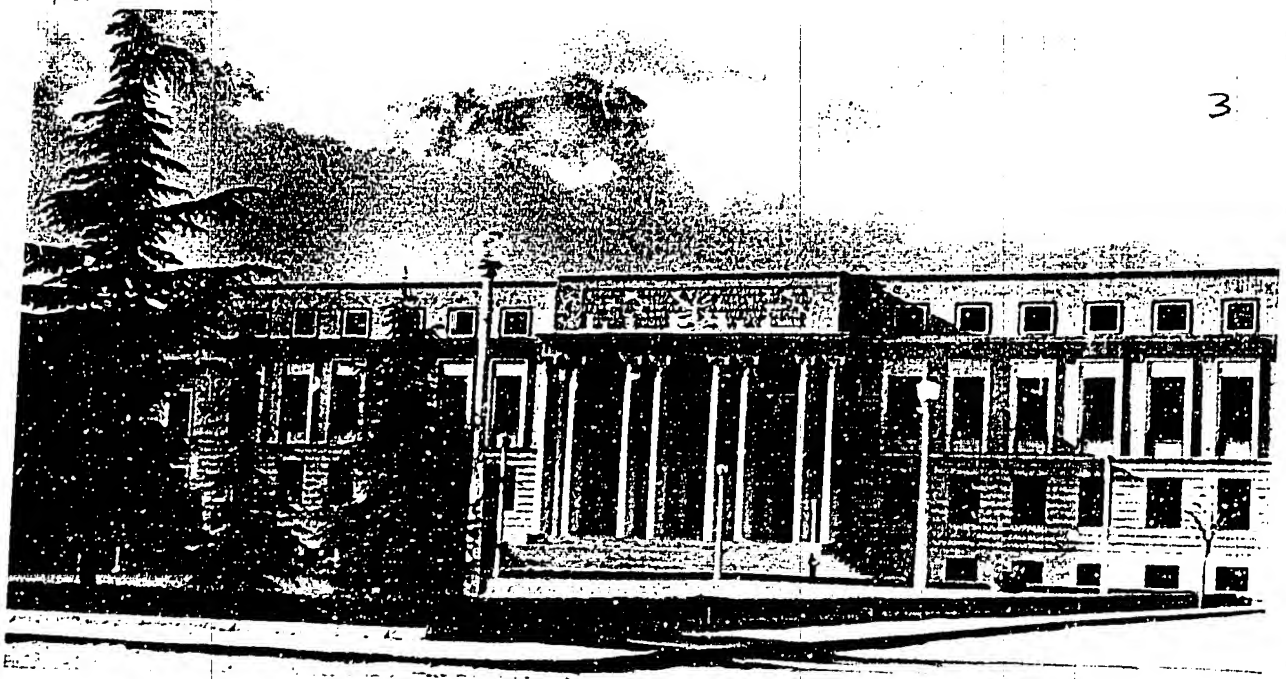
This is the supreme technical advisory organ of the Governing Body. It is composed of the President, the General Secretary and a small number of members chosen for their importance and their standing in the field of industrial and scientific research.

The Technical Advisory Council assists the Governing Body of the Foundation in a consulting capacity on all those matters concerned with the establishment and organization of new Institutes or Centres of Research; it aims at developing and coordinating those already in existence; examines the research programmes of its various centres, and draws up, supervises and coordinates the programmes for extensive long-range research, directing it along those channels which the interests of the nation may determine at any given moment.

SPECIAL TECHNICAL COMMITTEES

Their task is to advise the Governing Body on all those matters which concern the planning and development of any specific research activity. They undertake those studies with which they are entrusted with a view to the establishment or reorganization of an Institute or Centre of Research and the coordination of the different activities affecting that particular branch of investigation which is submitted to their consideration. These committees are made up of a small number of specialized members who automatically cease in their functions once they have submitted their report on the specific subject which was assigned to them.

3



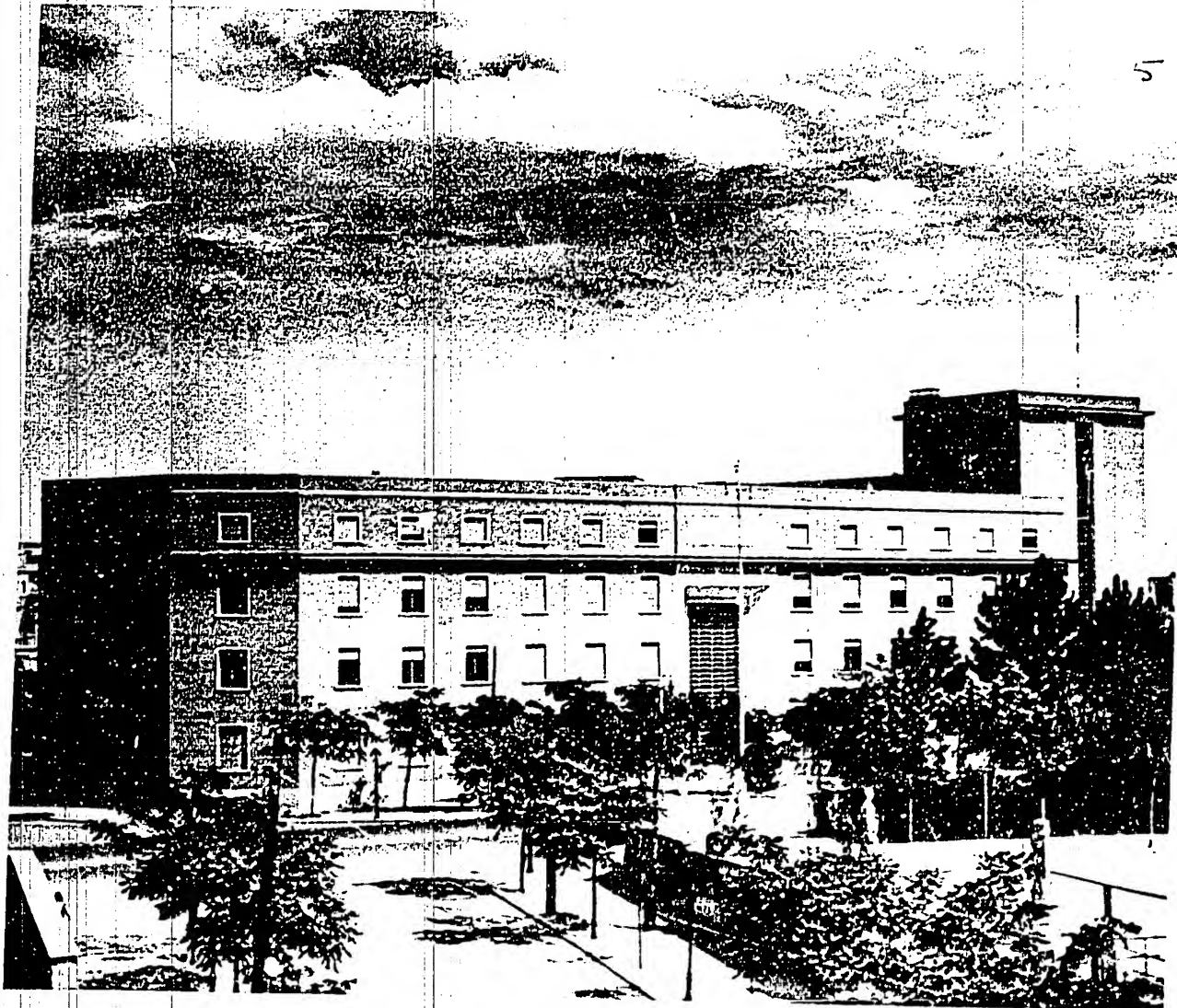
The greater part of the Institutes and Centres of Research of the Foundation owe their establishment to the reports issued by these Special Technical Committees.

INSTITUTES AND CENTRES OF RESEARCH

The body of technical research entrusted to the Foundation is carried out through the Institutes or Centres of Research set up and organized by its Governing Body, and through all those national and private centres which, though not integrated into the JUAN DE LA CIERVA Foundation, are interested in its activities and wish to cooperate in the solution of those technical and industrial problems directly related to their field of activity. Hence the Foundation classifies its research centres into •dependent• and •independent• Institutes.

a) The former centre their activity on the investigation of technical problems connected with a specific branch of science or industrial application.

These Institutes are created as a consequence of a perfectly defined industrial activity and are aimed at meeting an actual need of a scientific nature. This makes their development all the more practicable as the financial interests of the industries affected are directly concerned with their progress. In other cases the Foundation provides for the establishment of an Institute whose line of research does not as yet correspond to any organized industrial activity whether already in progress or in an advanced stage of development. They are, on the contrary, devoted to the study of all those problems which, in the implementation of the nation's scientific policy, the Foundation considers worthy of attention. To meet these needs, therefore, the Institutes concerned have been set a twofold objective: the development of those techniques to which scientific research in other countries has contributed and a more rational and effective exploitation of our natural resources.



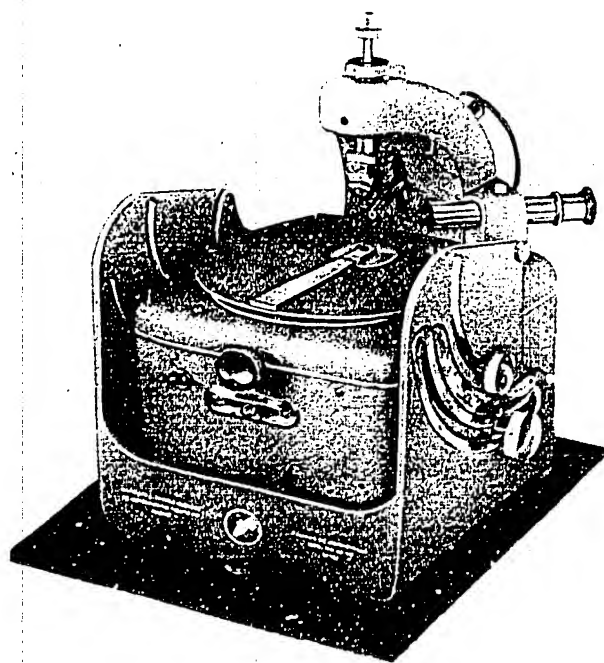


The Juan de la Cierva Foundation
A view of the Library

The JUAN DE LA CIERVA Foundation embraces at present the following dependent Institutes:

- The Leonardo Torres Quevedo Institute for Scientific Apparatus;
- Institute for Technical Research on Building and Cement;
- The National Institute for Fuel Research;
- The Institute for Research on Fats, Oils and Related Products;
- The National Institute for Rationalization;
- The Welding Institute;
- The Iron and Steel Institute;
- The Institute of Electronics.

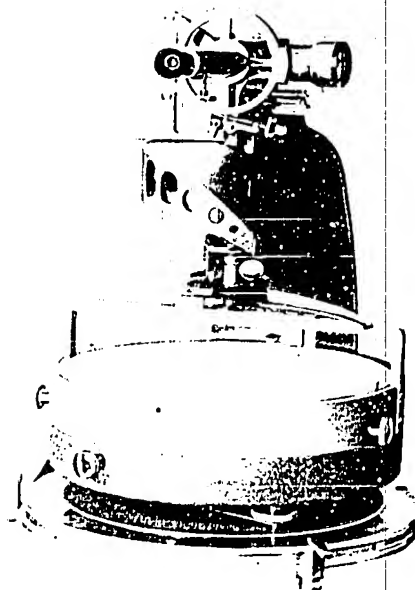
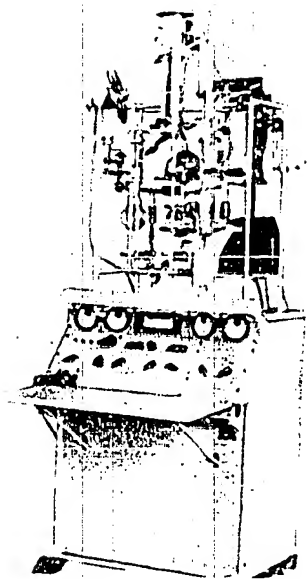
Furthermore it has founded a Department of Industrial Fermentation in the Institute of Microbiology, the Plastics Section of the Alonso Barba Che-



The L. J. Torres Quevedo Institute
Laboratory Apparatus for Molecular Diffusion

The L. J. Torres Quevedo Institute
Long Beam chamber

The L. J. Torres Quevedo Institute
Recording Photoelectric Scanning Apparatus



21
mical Institute and the Section of Marine Biology in the Institute of Applied Biology in Barcelona.

The funds earmarked for the financing of the so-called «dependent» Institutes and Centres are provided by direct Government subsidies, by provincial and local agencies, by private firms either in the form of grants and gifts, or, in certain instances, by the receipts accruing from their work. Some centres receive a small contribution from the users of certain products who, in their turn, are represented on the Advisory Councils of the Institutes. These users thereby cooperate in the drawing up of the research programmes of the Institutes to which they bring their own technical problems; and

b) In the pursuit of its research activities the Foundation also has recourse to the so-called «independent» Centres of an official or private character, with which, in each particular instance, it draws up an agreement of cooperation.

1. The coordinated Institutes, which fall into this last class, are so named because of the continuity and importance of their contribution to the work of the Foundation.

In the fulfilment of definite aims the coordinated Institutes, taken either as a whole or in any one of their different sections, may be affiliated to the JUAN DE LA CIERVA Foundation either on a permanent or on a temporary basis. This cooperation, which does not imply the slightest encroachment on their degree of independence, aims exclusively at the utilization of their facilities and resources in scientific man-power in the development of the technical research programmes which the Foundation encourages. In exchange for these services, the coordinated Institutes receive financial aid from the Foundation in direct proportion to their degree of cooperation.

At present, the following are in existence:

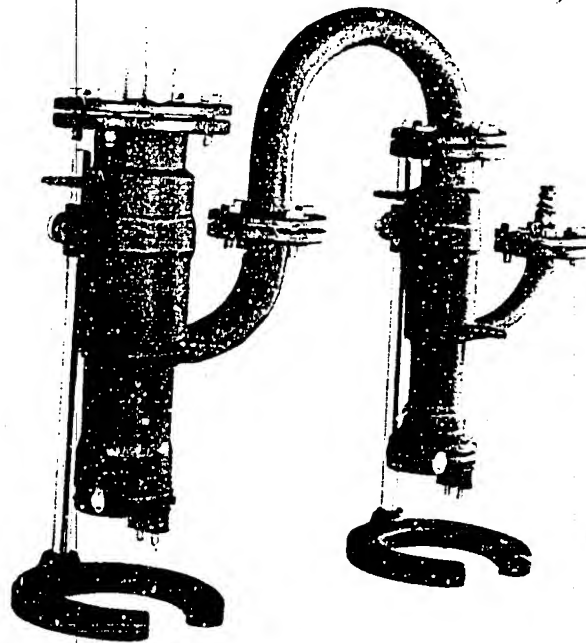
The Institute for Technical Research in Barcelona;

The Spanish Electro-Technical Association;

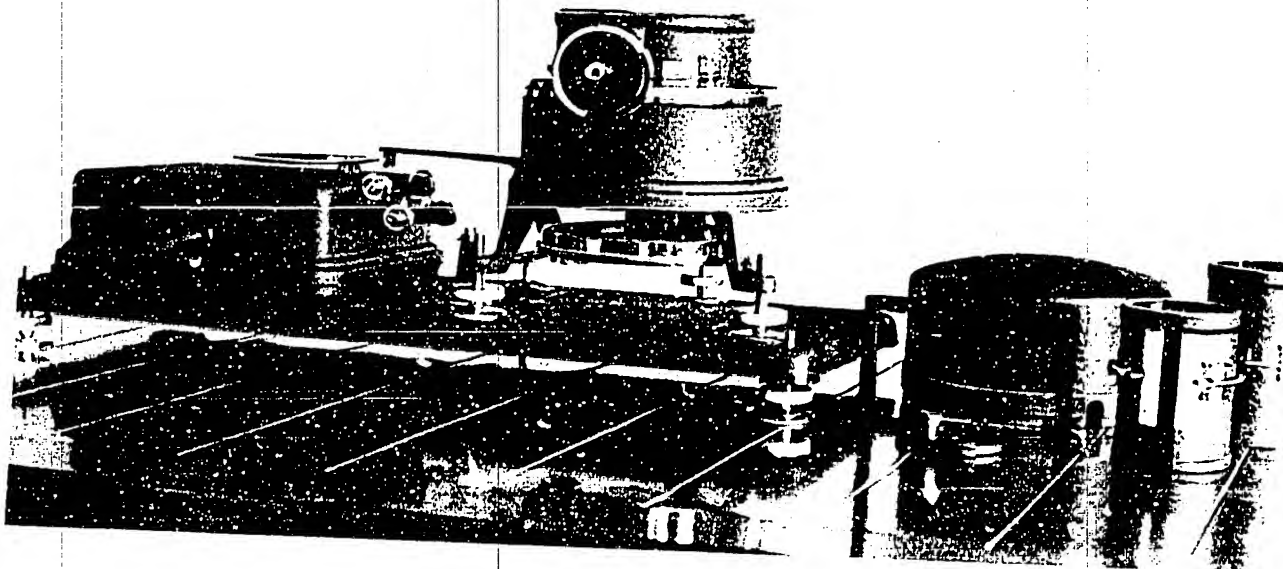
The Laffon Selgás Laboratory for Electro-Acoustical Research;

The Institute for Experimental Research in Forestry;

The National Institute for Technical Aeronautics;



The L. Jones Quake to Institute
Oil Extraction Pump



The L. Jones Quake to Institute
Pressure Chamber

The Calvo Sotelo Research Centre for Synthetic Fuels and Lubricating Oils.

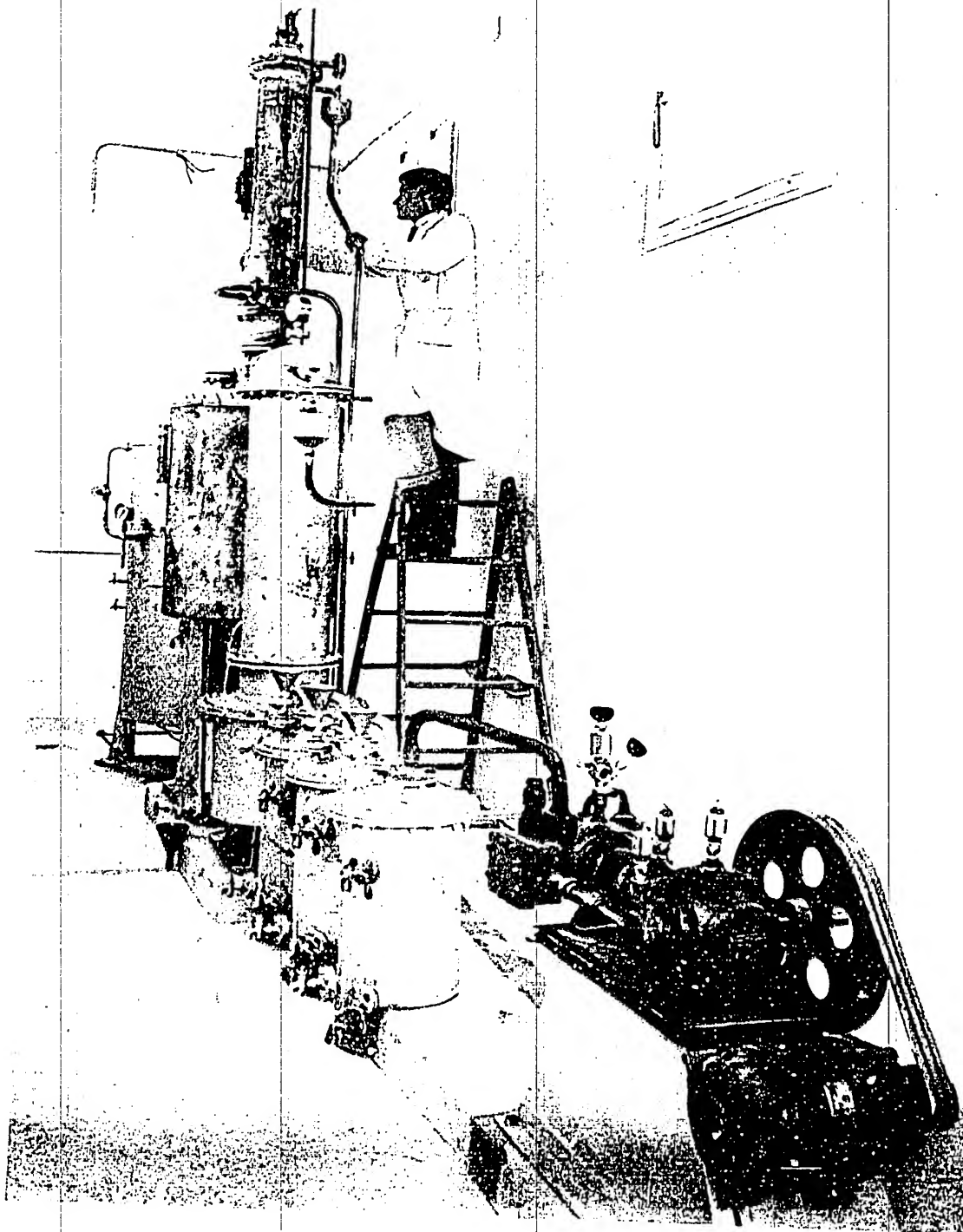
2. The JUAN DE LA CIERVA Foundation also benefits from the collaboration of non-coordinated official and private Centres and Laboratories, commissioning and subsidizing members of their staffs in their particular fields of research. Thus, apparatus as well as staffs fully trained in modern methods of research can be employed to the best advantage; at the same time the work of the Institutes is stimulated and the training of research workers encouraged.

- The following Centres cooperate in this way:
 - The Alonso de Santa Cruz Institute of Physics;
 - The Alonso Barba Chemical Institute;
 - The Institute of Microbiology;
 - The Institute of Entomology;
 - The Antonio de G. Rocasolano Institute of Physical Chemistry;
 - The Daza de Valdés Optical Institute;
 - The Institute for Soil Research;
 - The Laboratories of the Universities of Madrid, Barcelona, Sevilla, Granada, Oviedo and Valencia.

RELATIONS BETWEEN RESEARCH INSTITUTES AND INDUSTRY

The research Centres embraced by the Foundation together with the coordinated Institutes cannot by any means be considered as a substitute for the laboratories of private industry in each particular field of research; on the contrary, they are planned with the exclusive aim of furthering scientific endeavour in private industry and of ensuring that each industry possesses its own scientific research organization.

Representatives of industrial concerns have been admitted to the Councils of several Institutes which undertake the solution of their particular



12

technical problems; on the other hand, the Institutes can have recourse to private industrial installations which are employed for specific types of research once an appropriate agreement has been reached. This policy, it is hoped, will foster a comprehensive and unreserved collaboration between Industry and the Technical Research Centres of the Foundation.

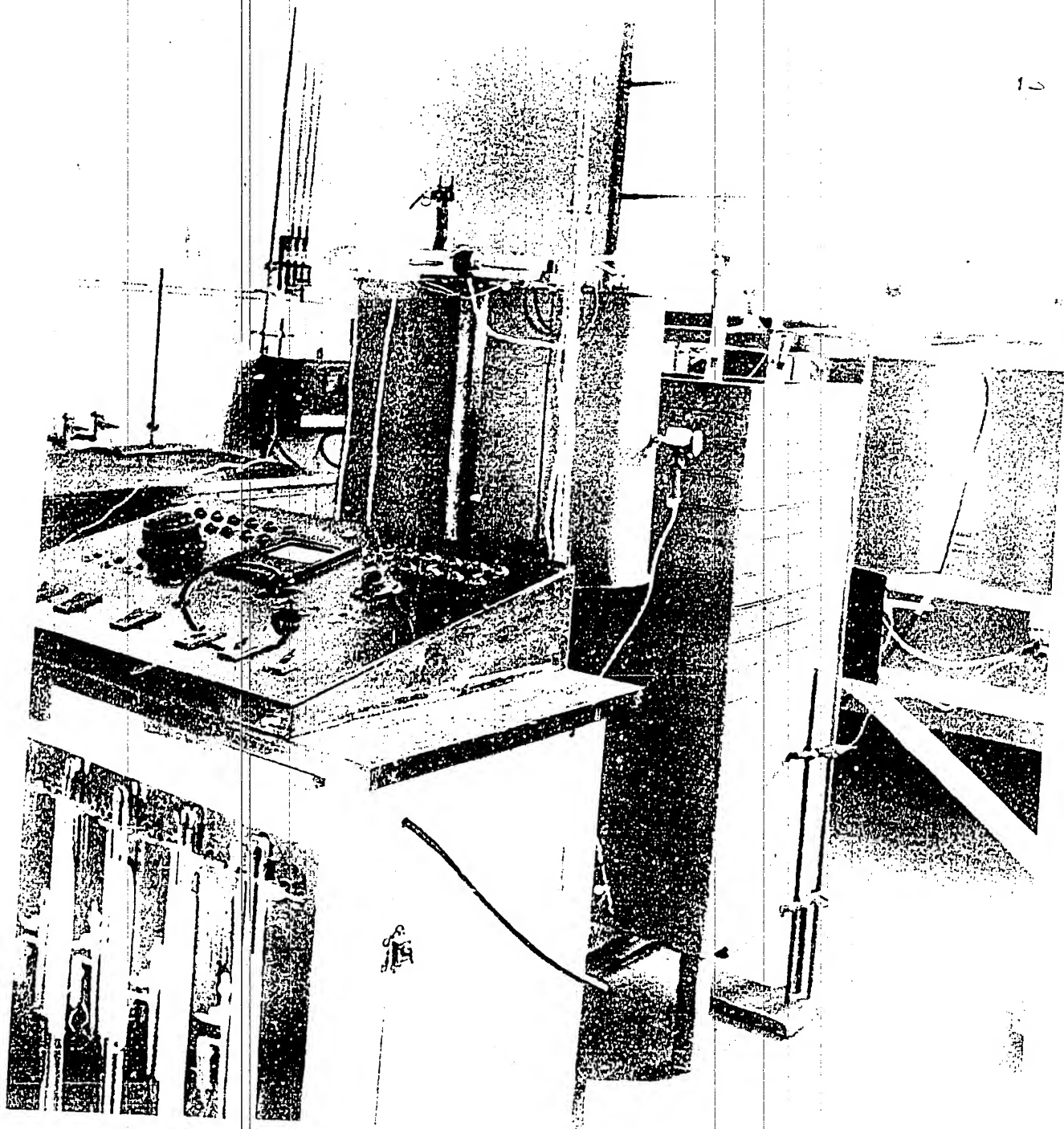
TRAINING OF RESEARCH PERSONNEL

A certain number of holders of research grants, distributed among different national and foreign centres of research, devoted to the study of new vital problems and techniques as well as to the acquisition of a high degree of efficiency, will constitute a reserve of scientific man-power. From this reserve the Foundation will select that personnel to whom, in the future, all the technical and industrial research for which it is responsible will be entrusted.

No student in possession of a grant may go abroad before he has attained the required standard of scientific knowledge. To further this end, the Foundation organizes, through its Institutes, Higher Courses in Research Training. These courses, which cover a series of specialized techniques, are given under the direct supervision of well-known scientists and engineers. As far as possible the courses will be organized with the collaboration of the Universities and Special Schools of Engineering.

BASIC RESEARCH

The JUAN DE LA CIERVA Foundation is greatly interested in basic research undertaken by other Foundations, and stimulates and encourages research workers to find a spiritual and material incentive in their field of pure research. Prizes are awarded to scientists of other Institutes, as well as



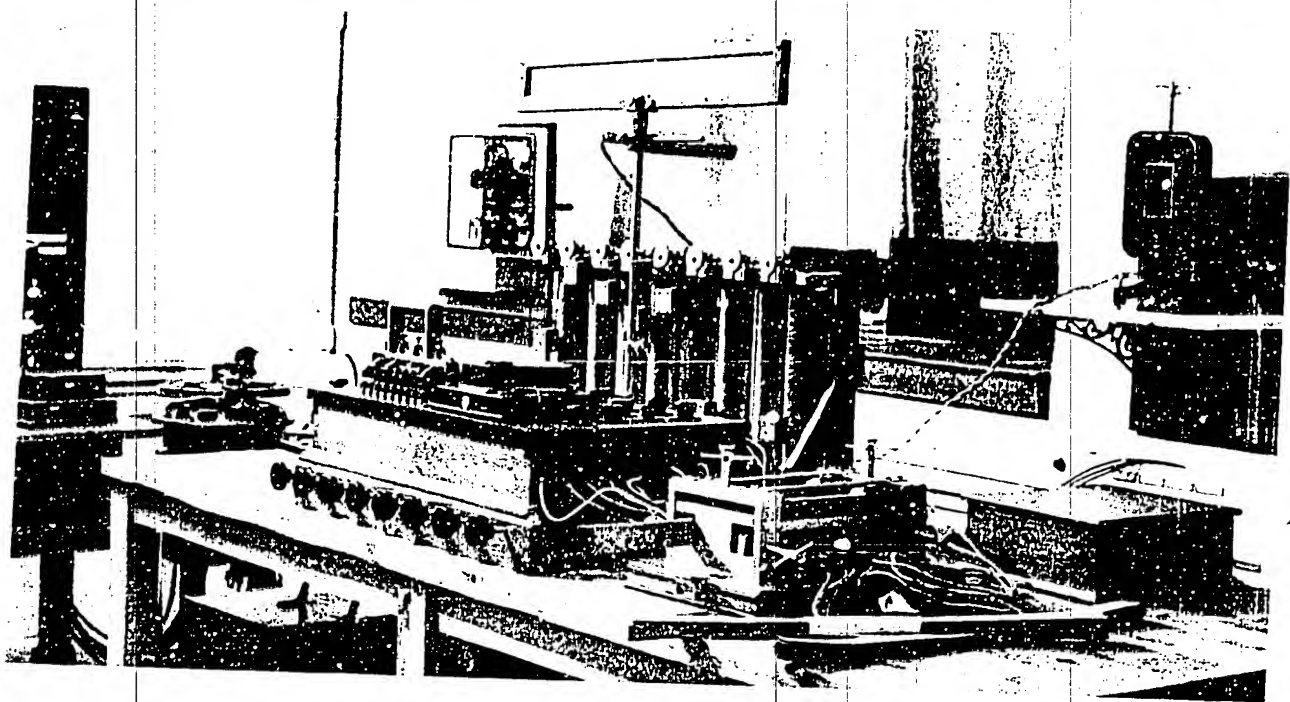
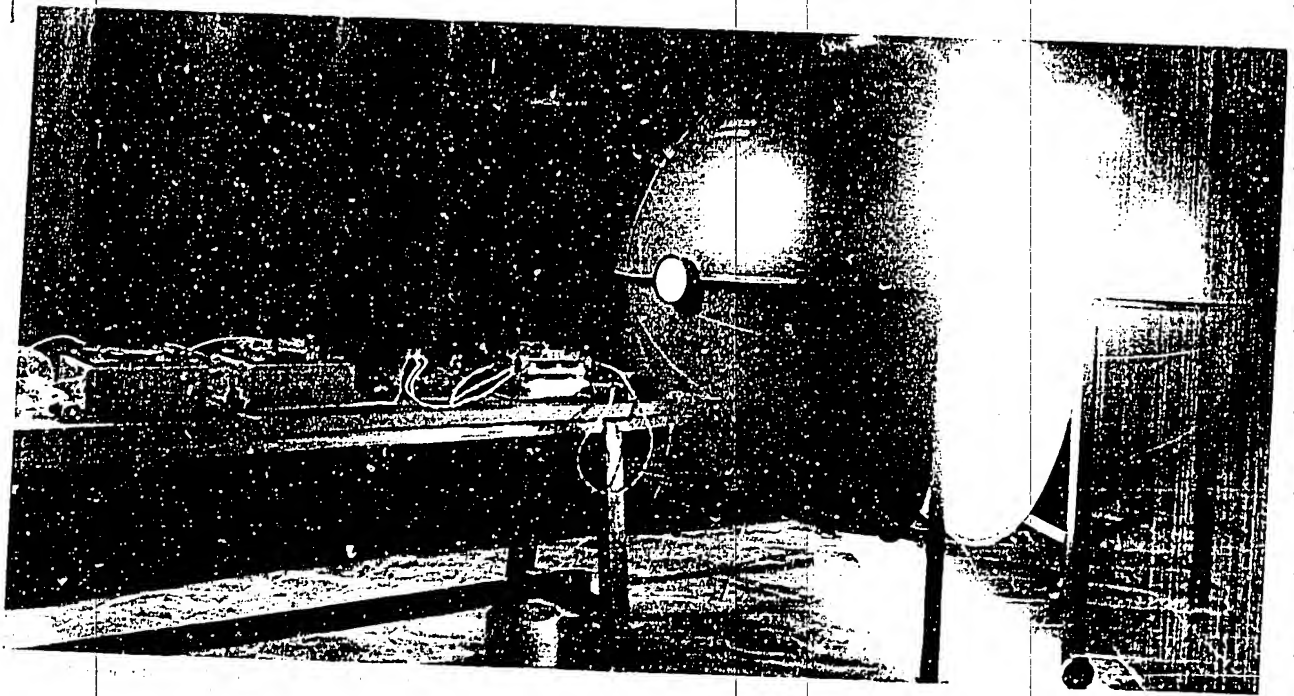
research grants to the graduates of their staffs. Grants can also be assigned for special scientific equipment, the cost of which cannot be met by the financial resources of a particular Institute.

CONTROL OF PATENTS AND INVENTIONS

The rights of each investigator to benefit from his research work have been regulated and the study and examination of all those inventions submitted to the Foundation has been duly organized; scholarships and other types of financial aid being granted with the purpose of furthering those development schemes which are deemed worthy of support.

SCIENTIFIC INTERCHANGE

The JUAN DE LA CIERVA Foundation strives constantly to maintain the closest relation with foreign Centres of technical investigation by promoting visits and the interchange of their more prominent members and organizing a Foreign Section which is charged with the organization of relations with our special delegations abroad and the reception of specialized foreign journals. With these and other publications, a specialists' reference library has been constituted and placed at the service of national technical research. At present the library receives more than 500 scientific publications, most of them British and American, and a very considerable number from European and other countries. The Foreign Section has been entrusted with the task of studying and reporting on the organization of applied research abroad and this information is later distributed among the technical staffs of the various centres of the Foundation.



JOURNALS AND PUBLICATIONS OF A GENERAL CHARACTER

Since 1948 the JUAN DE LA CIERVA Foundation has been publishing its own Journal, the «Revista de Ciencia Aplicada» (Journal of Applied Science), which in no way interferes with the special publications of its different Institutes.

The first volumes of the series «Investigación y formación científica en el extranjero» (Scientific Research and Training Abroad) entitled «Hacia una nueva organización científica en los Estados Unidos» (Towards a New Organization of Science in the U. S. A.) and «Ciencia e Industria en la Gran Bretaña» (Science and Industry in Great Britain) have already been published. The reports published by the Special Technical Committees and the 1946, 1947 and 1948 Memoranda give a sufficiently detailed account of the tasks already accomplished or under way in the different Institutes of the Foundation, in the Coordinated Institutes and in those centres which collaborate in its research activities.

INSTITUTES AND CENTRES OF RESEARCH OF THE FOUNDATION

THE LEONARDO TORRES QUEVEDO INSTITUTE FOR SCIENTIFIC
APPARATUS.—Serrano, 152. - Madrid.

A brief summary of the work carried on by this Centre may be classified under the three following headings:

1. Manufacture of prototypes of all kinds of scientific or technical apparatus for use in educational centres.
2. Manufacture of apparatus for scientific purposes whether for research or industrial use. Some of these have been invented and designed by the research workers of the various Centres or Institutes of the Higher Council

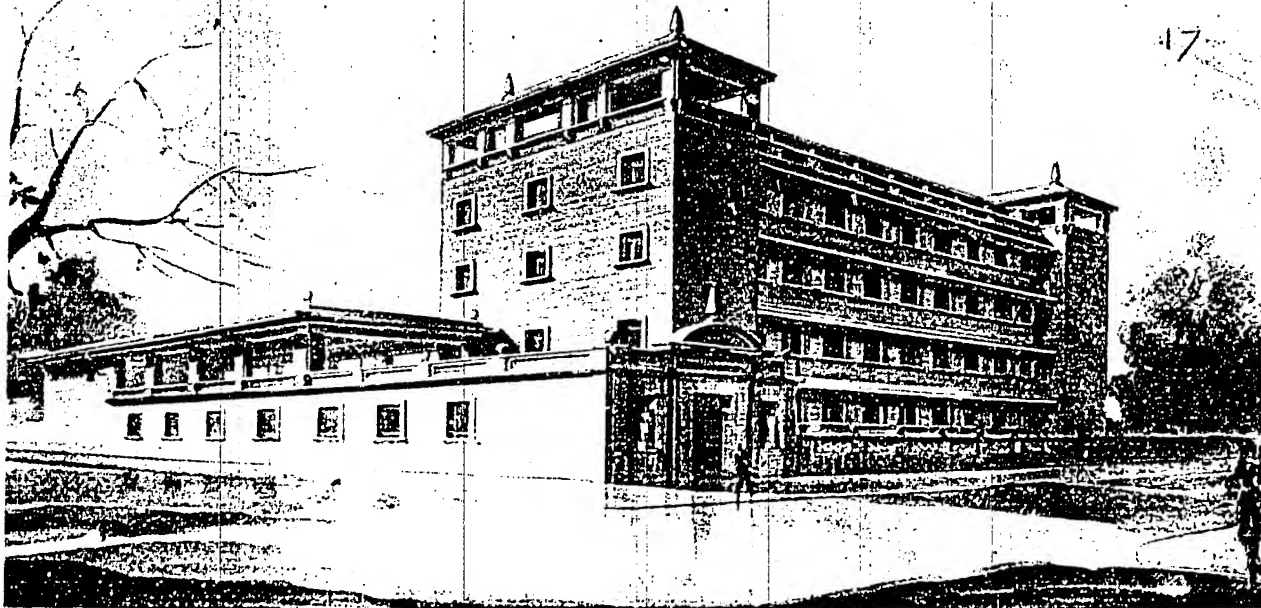
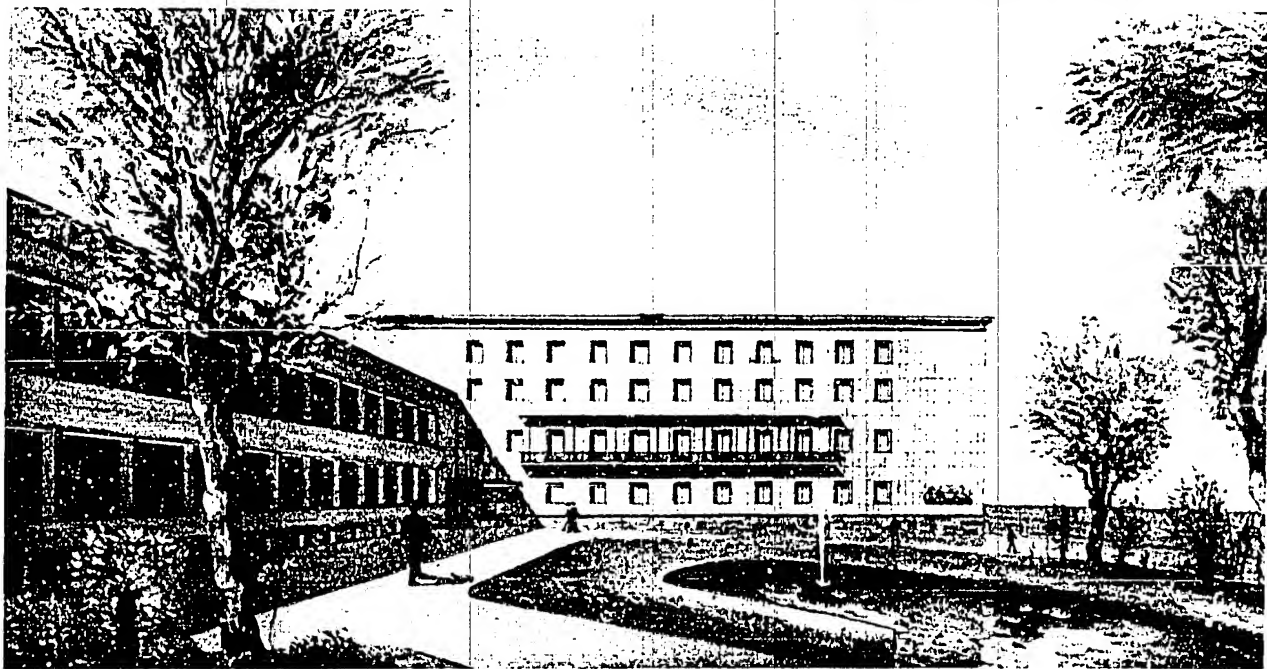


Fig. 1. The main building of the Ministry of Defense, Moscow, U.S.S.R.



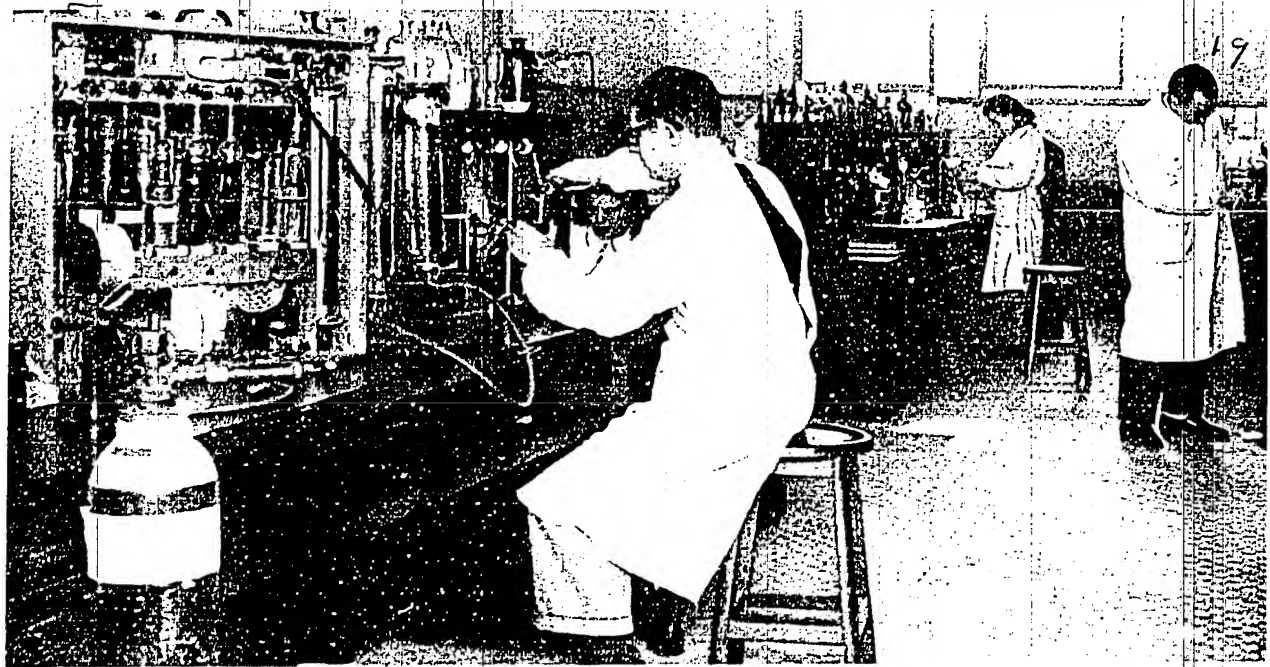
for Scientific Research with the aim of employing them in the pursuit of specific research activities.

3. Manufacture of those prototypes of equipment which, though necessary for the development of our national industry, cannot yet be satisfactorily designed or produced by the latter.

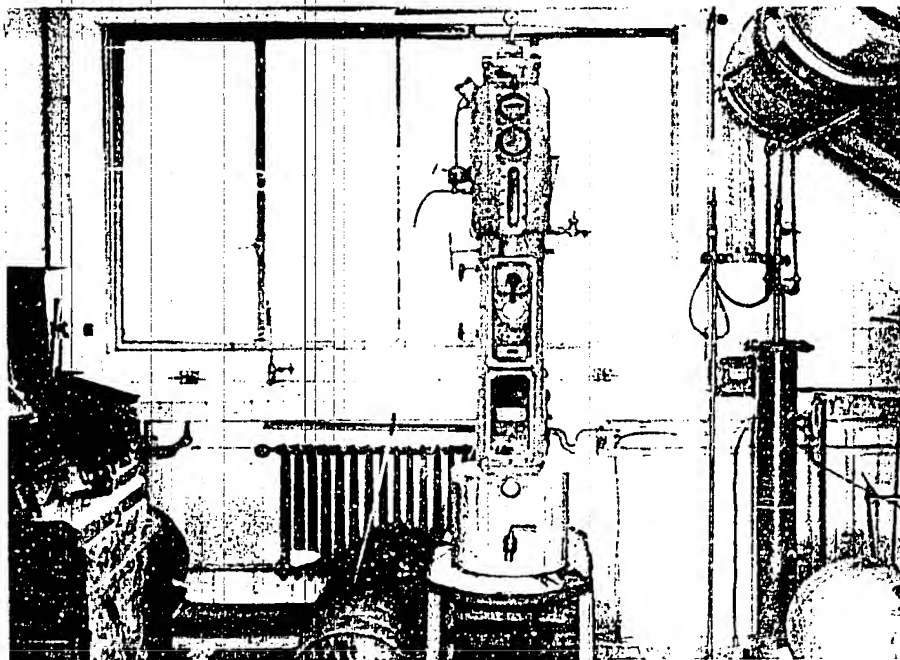
By the end of 1946 the Institute had manufactured more than sixty prototypes of apparatus and equipment. Raw materials employed as well as research workers and techniques were exclusively Spanish. During 1947 many more were designed and manufactured. Among them the following are worthy of attention: a laboratory installation for molecular distillation; oil and mercury diffusion pumps; vacuum indicators; potentiometers employed in electro-sounding techniques; seismographs and geophysical recorders; double contact micro-relays; double level barometers; wired microphones and resonators; metallographic polishers; high tension electrostatic machine; pH recorders; cathode ray oscillograph; rectifiers; reducers, etc. The activities of the Institute during 1948 include the production on a small scale of standard apparatus, and the study, design and manufacture of new types of instruments and high precision apparatus. The most important are: an odometer press; a capacity meter; comparing-rule for barometers and barographs; conductivity bridge; geophysical transmitter and receiver; an electronic switch; fire-damp detector; molecular distillation unit; lyophilization apparatus; Geiger-Müller counter; variable pitch oscillator, inductancemeter, double Thompson bridge, etc.

TECHNICAL INSTITUTE FOR RESEARCH ON BUILDING AND CEMENT.—Velázquez, 47. —Madrid.

The activities of this Institute have a twofold objective; Research on Building and Cement Research. Those of the Building Division in their turn can be divided into theoretical or design work, on the one hand, and research on practical building problems, on the other. The Cement Division



Isotope Fuel Fabrication Laboratory



20

undertakes technical and industrial research on everything concerned with the manufacture and application of hydraulic binders.

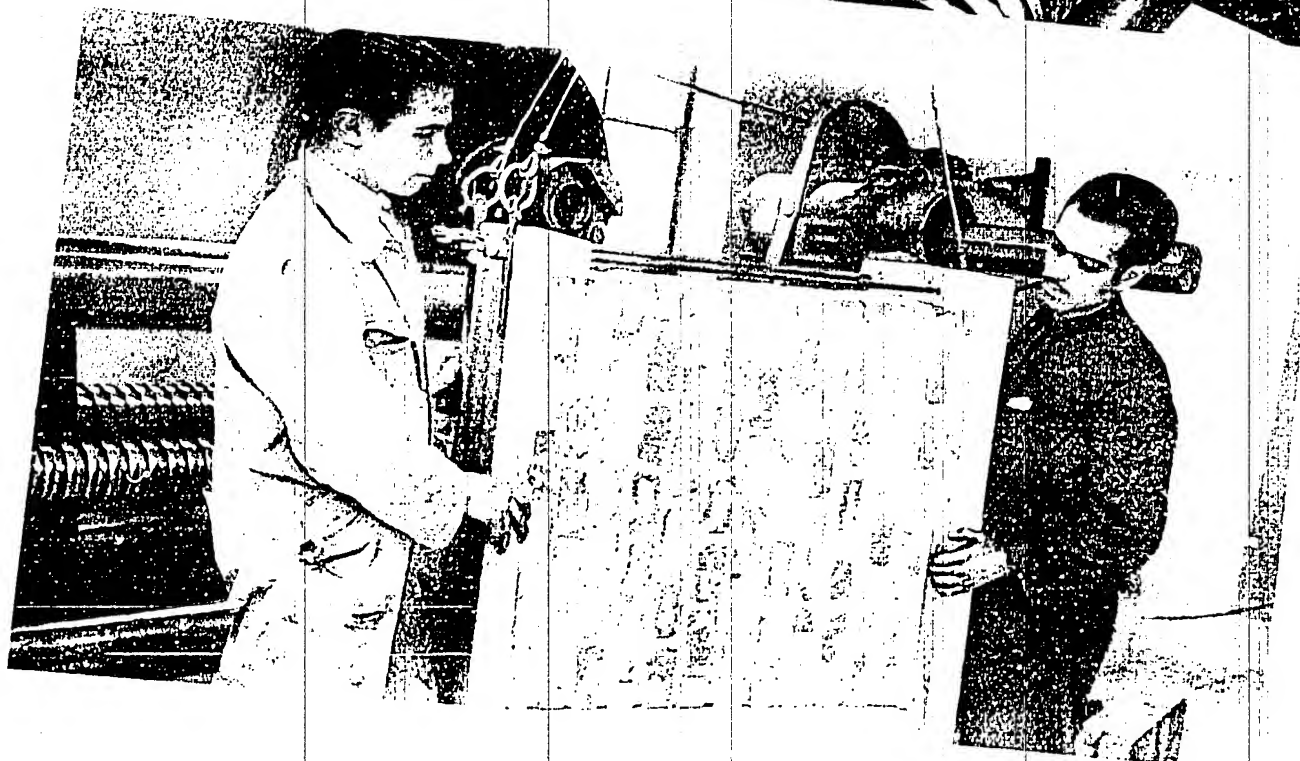
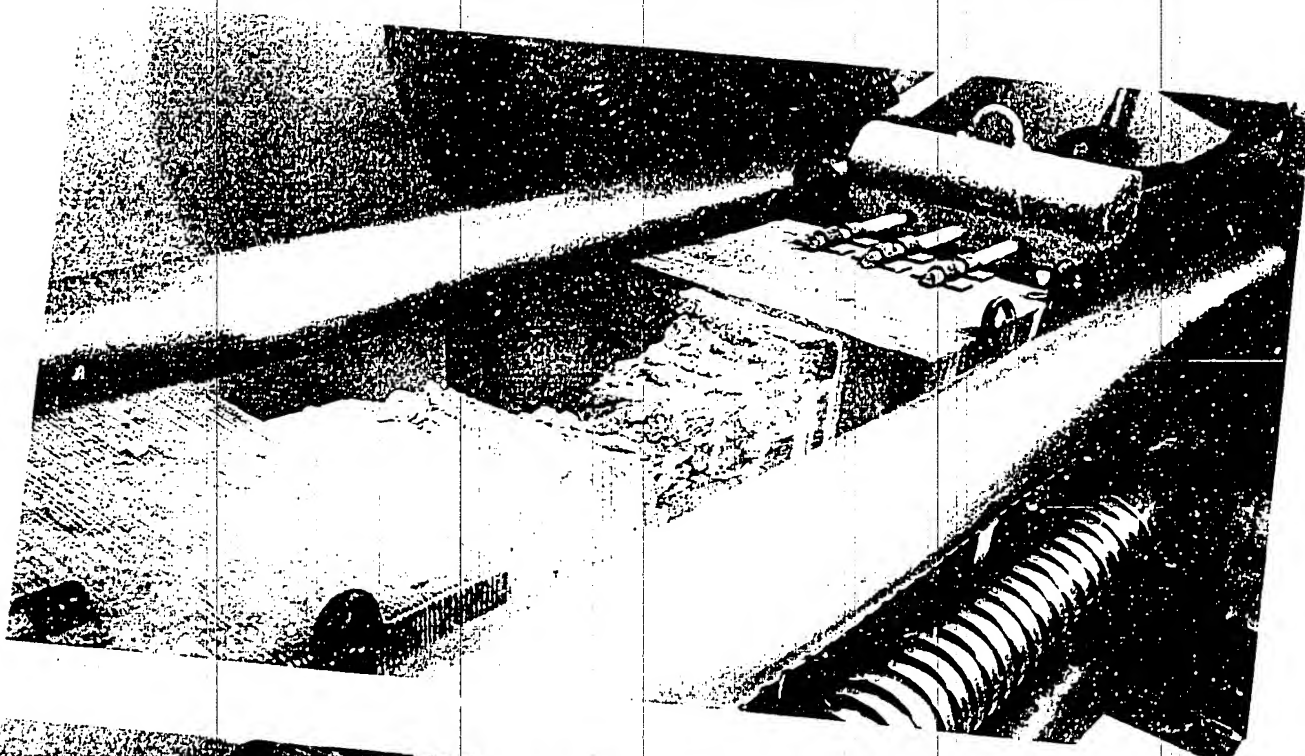
The Institute has published the results of its research on the following problems:

- A contribution to the study of stressed structures;
- Heavy load concrete strains;
- The determination of safety factors in the testing of reinforced concrete sections;
- Heterodox testing methods applied to reinforced concrete sections;
- A new method of anelastic calculations for concrete sections;
- A tentative test for the determination of the strength of anelastic materials applied to reinforced concrete;
- Anelastic calculations of reinforced concrete sections;
- Practical laws and formulas for the measurement of sections;
- The anelastic behaviour of reinforced concrete in prismatic sections.

At present it is undertaking different investigations of which the most important are:

- 1.—Building experiments in the use of concrete forms.
- 2.—A study of prefabricated reinforced concrete trusses.
- 3.—Methods of calculation and construction of laminated cylindrical reinforced concrete.
- 4.—A study of equivalent overloads in building calculations.
- 5.—An experimental study of wrought materials employed in building techniques.
- 6.—An artificial lighting system.
- 7.—A heating system for buildings.
- 8.—The organization of work in excavations.

A) The Cement Division of the Technical Institute for Research on Building and Cement is at present conducting research work on the following problems: I. Heat of setting.—II. Influence of gypsum dosage on the setting properties of cement.—III. Cements with a high dosage of magnesia.—IV. Studies on the fineness of cements and its practical determination.—



V. Studies on thick pastes.—B) For its laboratory experiments the Institute uses the facilities of the Testing Materials Laboratory of the School of Civil Engineers, that of the Institute of Technical Investigations of Barcelona and the Laboratory of Military Engineers.

The Institute has published a paper entitled: •Dimensionamiento y comprobación rápida de arcos empotrados para puentes• (The measurement and rapid checking of built-in arches in bridges), and other similar publications are in preparation. It has gathered detailed information on the advantages of employing airted and injected concrete and has begun a study of the production, in Spain, of airted concrete which is very suitable for the construction of dams and the macadamising of roads.

It publishes periodically its own journal: •Informes de la construcción• (Building Information) and, at irregular intervals, numerous monographs.

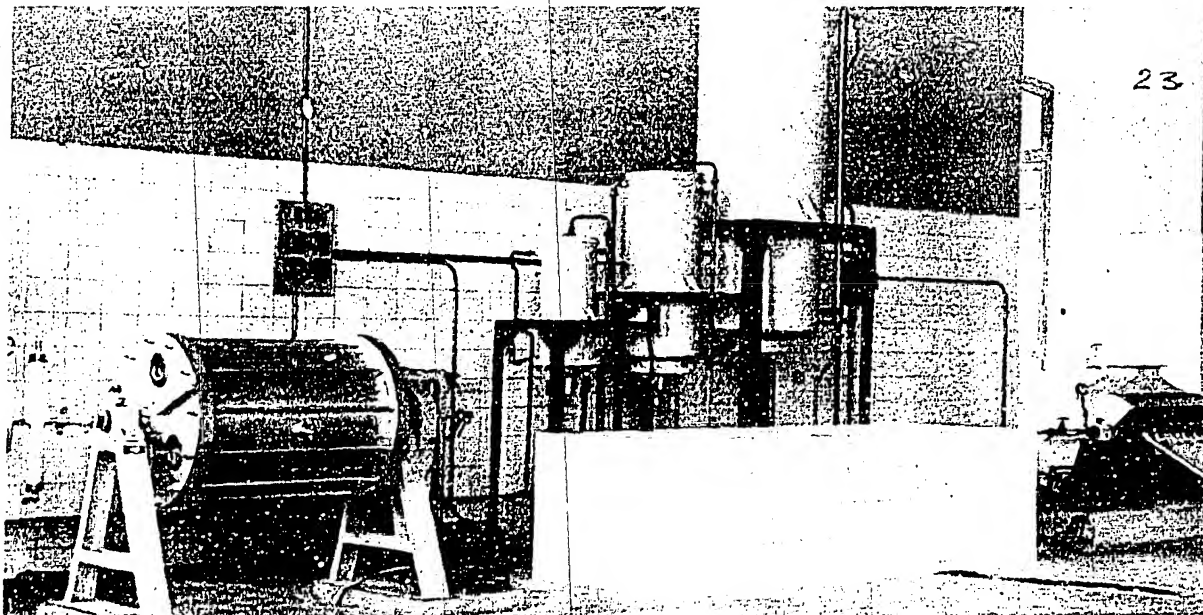
The Bulletins entitled •Ultimos avances en materiales de construcción• (Recent Progress in Building Materials) and •Ultimos avances técnicos en edificación• (Recent Technical Progress in Building) of which several numbers have already been published as also periodicals.

Scientific addresses by prominent personalities, both foreign and Spanish, in this field are an important part of the Institute's scientific policy.

THE NATIONAL INSTITUTE FOR FUEL RESEARCH.—Plaza de Salamanca, 8. - Madrid.

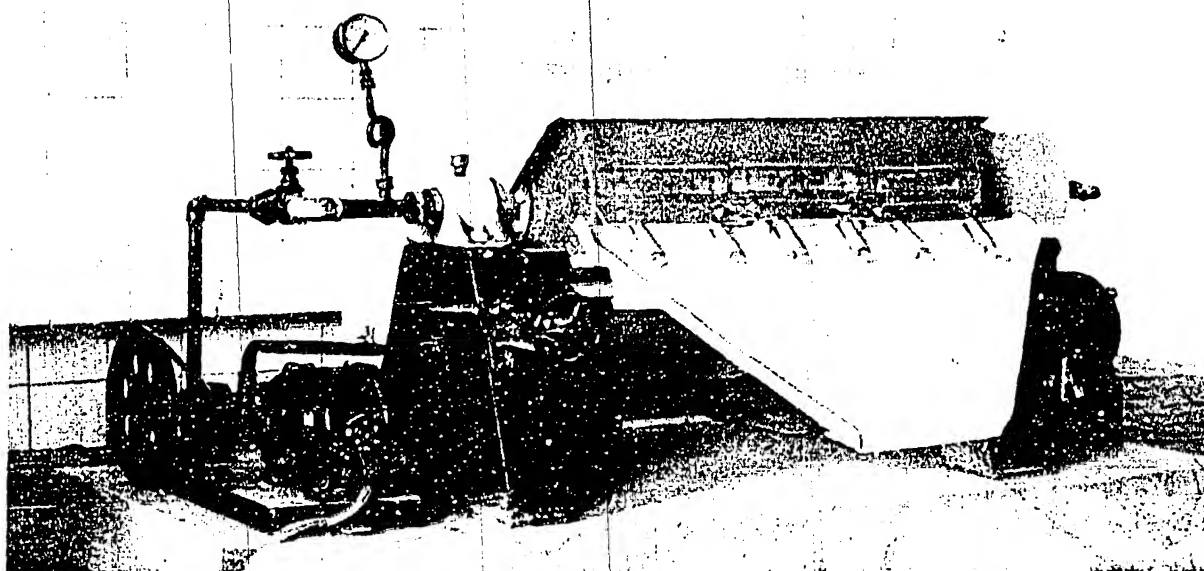
The work for which this Institute is responsible is carried out in the Oviedo Coal Institute and in the Zaragoza Section.

The activities of the Research Centre of the Calvo Sotelo National Corporation for Research on Synthetic Fuels and Lubricating Oils and the Instituto Nacional de Técnica Aeronáutica (National Institute for Technical Research on Aeronautics) (INTA) are coordinated with those of the Institute.



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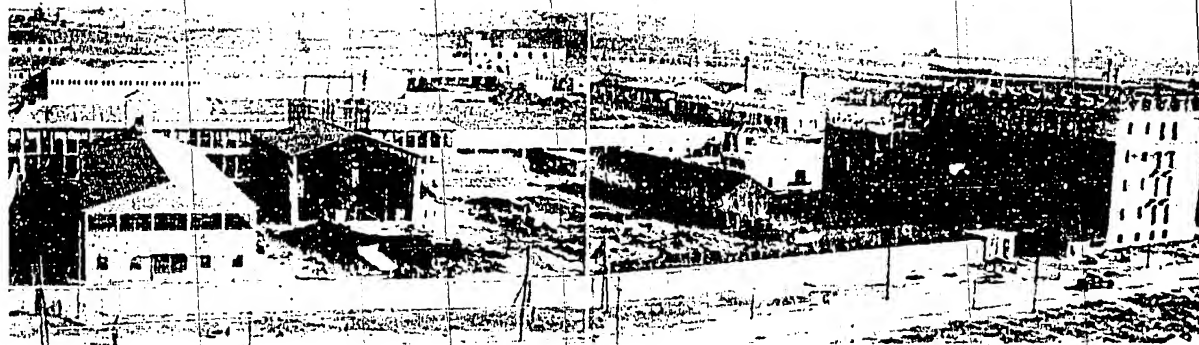
24

The Oviedo Coal Institute is divided into two sections: Engineering and Chemistry. Until it moves into premises of its own, it is making use of the facilities provided by the laboratories of the Oviedo University. At present the following research is in progress: tests on the mechanical properties of coal and coke; tests on the physical effects produced by heat in the pyrogenation of soft coal; and tests on the constitution and chemical properties of coal.

The Laboratories of the Zaragoza Section, housed in the Science Faculty of the University are the original laboratories of the Institute. This section is concerned with the study and classification of coal in the existing brown coal deposits of the provinces of Teruel and Zaragoza, the behaviour of coal and coke submitted to distillation, pressure hydrogenation, the production of briquettes and oxidation in the presence of air, etc. It publishes the periodical «Combustible» (Fuel) as an index to its activities.

The Research Centre of the Calvo Sotelo Corporation has started the building on an industrial scale of an installation for the manufacture of cerones, furnaces for the distillation of brown coal and bituminous shales from the Puertollano basin as well as a semi-industrial installation for the

«Calvo Sotelo» National Enterprise. General view of research centre under construction.





«Calvo Sotelo» National Enterprise. Hydrolisis pilot plant
(a perspective)

hydrolisis of ligno-cellulosic materials. Research is already in progress on the production of cetones, hydrolisis, the utilization of lignine and grape bagasse and the treatment of Spanish brown coal from the Puentes de García Rodríguez basin for the manufacture of gas oil, lubricating oils and paraffins. All these studies have yielded excellent results.

The research work carried out in the laboratories of the National Institute for Technical Research on Aeronautics (INTA) is concerned with the volatilization of lubricating oils from Puertollano bituminous shales, the aromatization of motor fuels for the preparation of aviation fuels and the obtaining of solvents, especially toluene.

26

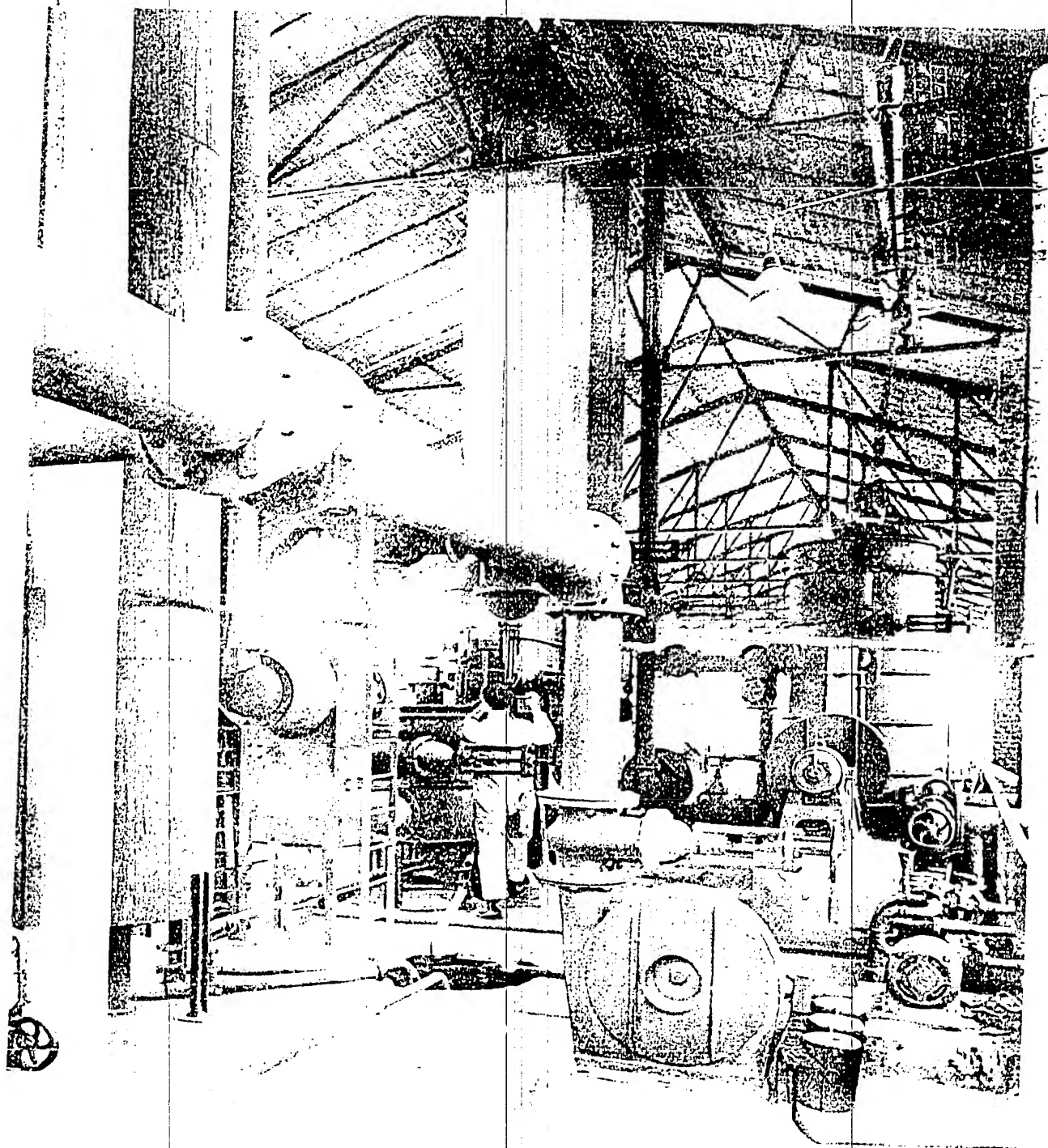
SPECIAL INSTITUTE FOR RESEARCH ON FATS AND RELATED PRODUCTS.—Santa Clara, 8. - Sevilla.

It embraces three sections: Chemistry, Microbiology and Engineering. It is undertaking chemical, physical and biological research in the interest of the vegetable and animal fat industries and their by-products. The subjects which are at present under consideration are the following: Production of oil by continuous methods without recourse to pressing bags. Solvent deacidification of the acids of olive oil and bagasse (chemical study of rancid olive oils, causes of rancidity and practical methods of avoiding it; chemical and physical studies on the preparation and preservation of olives). A study of the microflora of the olive during the garnering process. A micro-biological study of the preparation and preservation of olives. A study on the fermentation process of olive bagasse.

NATIONAL INSTITUTE FOR RATIONALIZACION. — Alcalá, 95. - Madrid.

The Institute is divided into the following departments: •Scientific Organization of Work•; •Standardization•; •Industrial Psychology•; •Utilization of Wastes•, and •Productivity Costs and Prices•.

To avoid the danger of these studies falling into the rut of mere theoretical speculation the Institute has sought the cooperation of the sectors of industrial activity which are interested in the solution of all these problems. Special Technical Committees have been established for this purpose. These Committees are entrusted with the task of studying all those problems which, falling within the scope of the Institute's activities, are of direct concern to the economic and industrial interests of the nation. At present there are forty seven such Committees in direct contact through its President, with the Administrative Council of the Institute.



28

The Institute publishes periodically the «Revista del Instituto Nacional de Racionalización del Trabajo».

INSTITUTE OF WELDING.—Goya, 58. - Madrid.

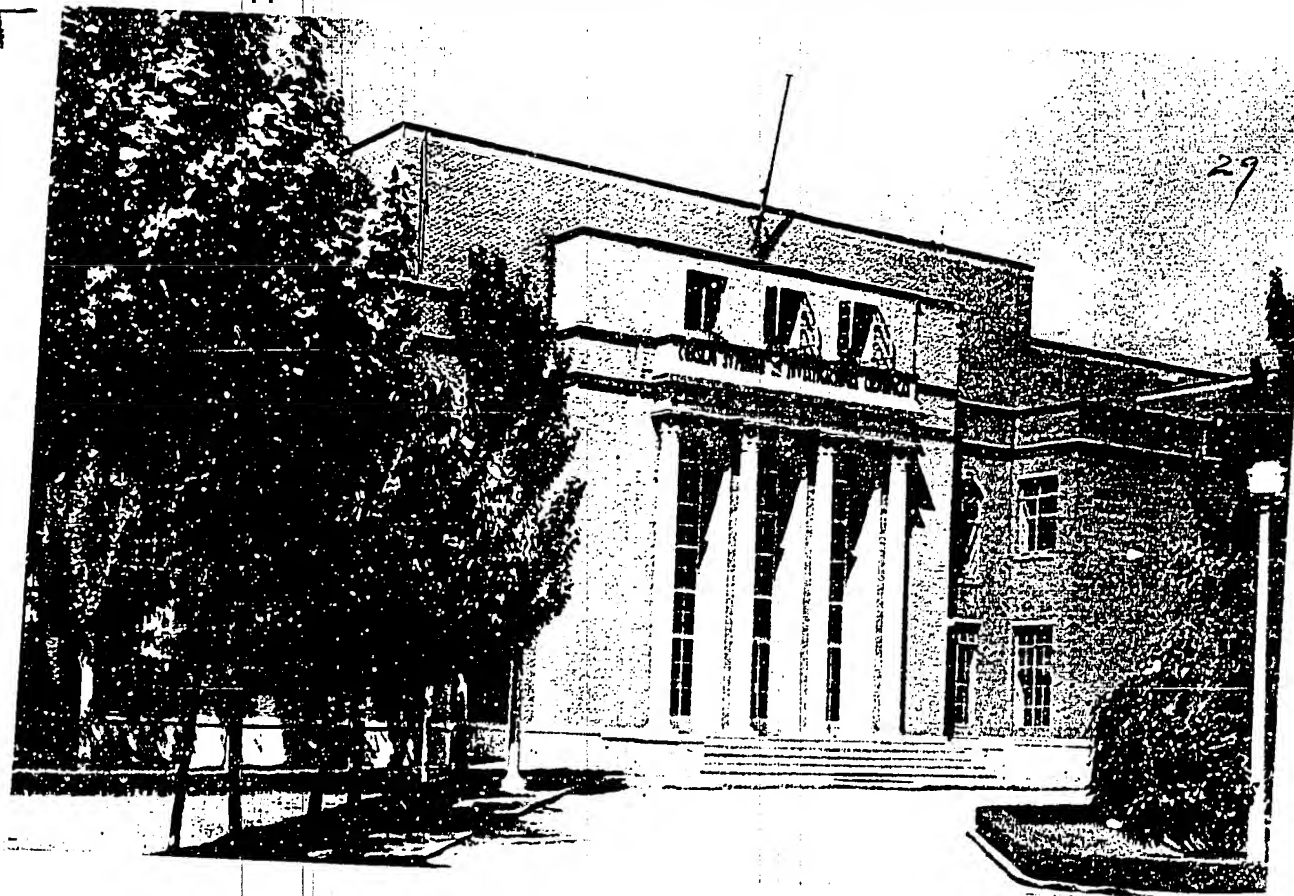
The Institute is divided into three sections: Research, Scientific, Information and Education. It carries on the following activities: a) Technical and scientific research on welding and the igneous treatment of metals; b) the initiation and control of all types of studies and publications on welding research; c) the laying down of norms of a purely advisory character as a guide to the technical training of the staff in every aspect of those activities especially connected with the welding techniques; d) Preparation of scientific and technical staffs specialised in welding techniques and research.

The Institute has almost completed the installation of its laboratories, and has given practical and theoretical courses in the preparation of technologists interested in welding. These, in their turn, will constitute the nucleus of the future research staff of the Institute. The Institute of Welding is in contact with most of its sister organizations abroad.

IRON AND STEEL INSTITUTE.—Villanueva, 15. - Madrid.

Its foundation dates only from the 23rd January 1947. It is divided into three departments: Technical Information, Industrial Research and the Laboratories, each of these departments is being divided into several sections.

The Department for Technical Information has attached the greatest importance to the Library and Technical Filing Sections, owing to the urgent need of providing the research staff not only with the reference books which it may require, but also with all the up-to-date technical information appearing in specialized journals.



The Alonso Borda Chemical Institute

The Institute publishes the «Revista del Hierro y del Acero» and the «Cuadernos de Fichas Técnicas».

The Department of Industrial Research is at present engaged on the solution of different problems related to the mining of iron ore, and on the raising, both on a quantitative and qualitative scale, of productivity in the iron and steel industry. In order to secure maximum efficiency, the Department is divided into the following sections: Iron; Steel; Rolling; Wrought Iron; Casting; Special Processes; Industrial Applications of Iron Products;

30

Laboratories; and Non-Ferrous Metals. In addition, an Iron Division has been established in Bilbao and another in Barcelona on industrial applications of Iron Products. Each of these divisions has already commenced its activities in its own particular field of research. The following are, for the present, the most noteworthy.

Iron Section: •Preparation and sintering of Spanish mineral ores• and •Survey and study of the iron deposits in the Vizcaya-Santander basin•. This investigation is undertaken in cooperation with the Bilbao Iron Division.

The Steel Section is investigating those aspects concerned with the scientific organization of production and the possibility of obtaining steel through direct reduction of the ore in electric furnaces.

The Rolling Division is, for the moment, mainly occupied with the installation of rolling mills and the possibility of manufacturing tin-plate and thin steel plates.

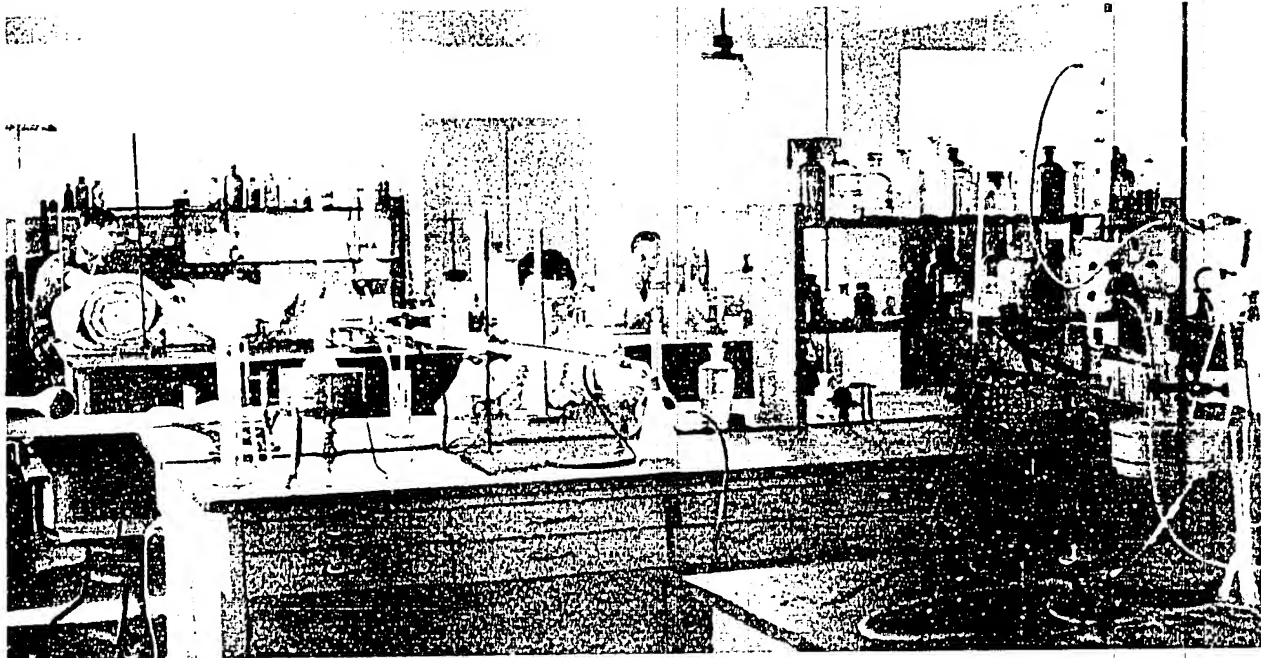
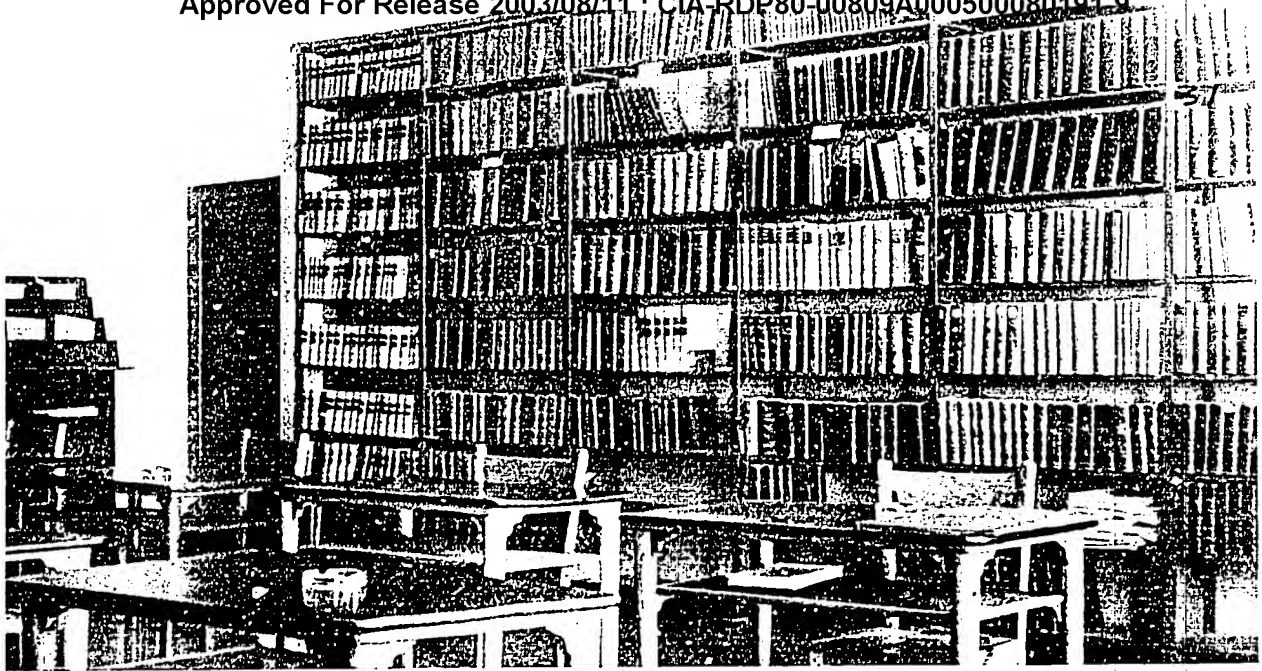
The Wrought Iron Section studies, among other subjects: a) Characteristics and possibilities of existing forges; b) Capacities and characteristics of forge equipment needed to meet future requirements; c) Drop and high tensile forging employed in the manufacture of special duty automobile and aviation crank-shafts.

The Casting Section has initiated research work on mechanical tests and casting clays and has been instrumental in the establishment of the •School of Casting•.

The Special Processes Section is interested in the manufacture of porous iron by the Höganäs and Wiberg methods, possibilities of the electric furnace and utilization of poor ores in the Renn-Krupp process.

The Section of Industrial Applications of Iron Products is now entrusted with the task of classifying steels according to their type and quality. In the Barcelona Section research on the process of nitration and the improvement of steels is now under way.

The Laboratory Section has begun its activities by studying the unification of methods of analysis and is now drawing up a report on those physical-chemical methods of analysis which it sponsors.



32

INSTITUTE OF ELECTRONICS.—Rios Rosas, 54. - Madrid.

Established in 1948, this Institute is in the early stages of its organization. It has drawn up an intensive research programme, and has made a beginning with the organization of courses of study and research for the selection and training of its scientific staff. The courses are given by prominent specialists. The creation and installation of a Central Laboratory is under consideration. In the meantime, the Laboratories of the National Institute of Technical Research on Aeronautics, the Official School for Telecommunication, the Office of Telecommunication, the Laboratory for Technical Research in Barcelona, the Laboratory of the School of Industrial Engineers, the Faculty of Science and the Daza de Valdés Optical Institute, the Institute of Radiology of the Faculty of Medicine, and others are cooperating with the Institute.

DIVISION OF INDUSTRIAL FERMENTATION. — Alfonso XII, 3. - Madrid.

It pursues its activities in connection with the Institute for Applied Microbiology. Its research programme deals mainly with the following subjects:

- a) The production of yeast-fodder and fermentable liquors through the acid hydrolysis of corn cobs and stalks, orange rinds, pressed orange pulp, vine branches, etc.
- b) The manufacture of citric acid by *Aspergillus niger* fermentation. The strains most commonly employed are n° 3 of the Cajal Institute and 67 N. R. R. L. D. (Peoria, U. S. A.).
- c) Research on the production by bacterian fermentation of 2-3 Butilenglycol and Butadiene; and
- d) Glyceric fermentation of sugars by employing hydrolyzed products from agricultural wastes.

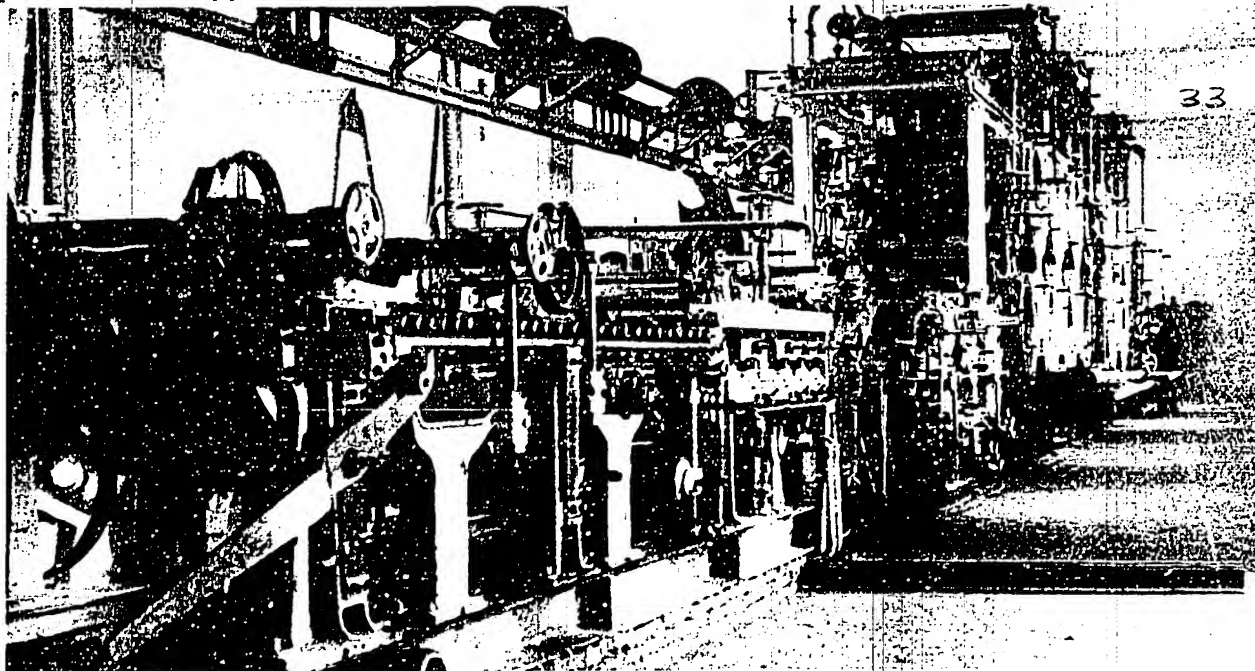
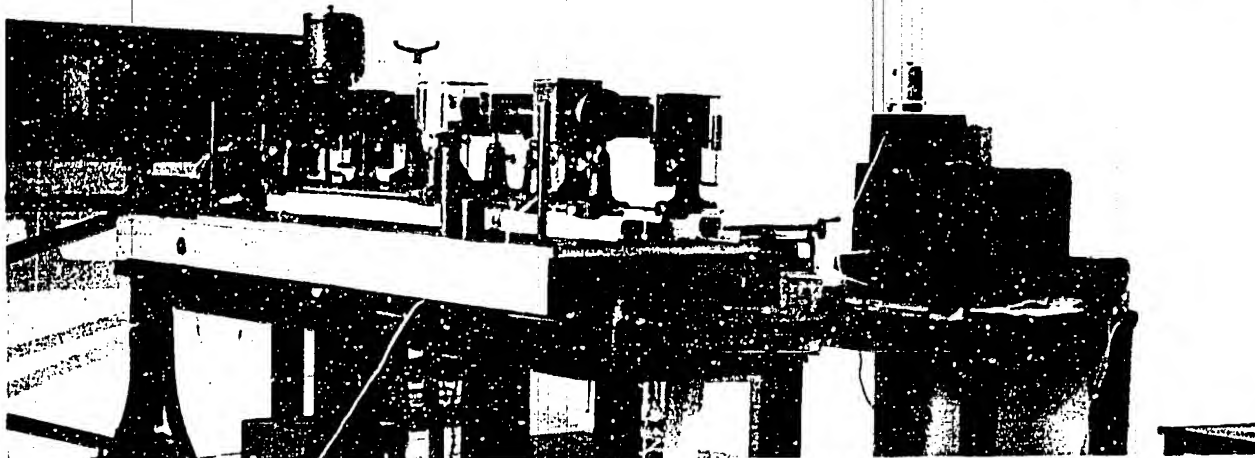


Figure 1. A large industrial machine, possibly a textile loom, with a complex frame and multiple spindles. The machine is situated in a factory setting.

Figure 2. A large industrial machine, possibly a textile loom, with a complex frame and multiple spindles. The machine is situated in a factory setting.



PLASTICS SECTION.—(Alonso Barba Institute.) Serrano, 119. Madrid.

This Section was established on the 10th. July 1947 and carries out its research activities in the Alonso Barba Institute of Chemistry. For the present, its research is confined to the manufacture of silicones and resins employed in diminishing the salinity of hard waters rendering those which contain a superabundance of harmful salts fit for drinking purposes and in the separation of anions and cations in the purification processes of industrial liquors. Work is also under way on the preparation of thermosetting resins employed in photoelastic techniques.

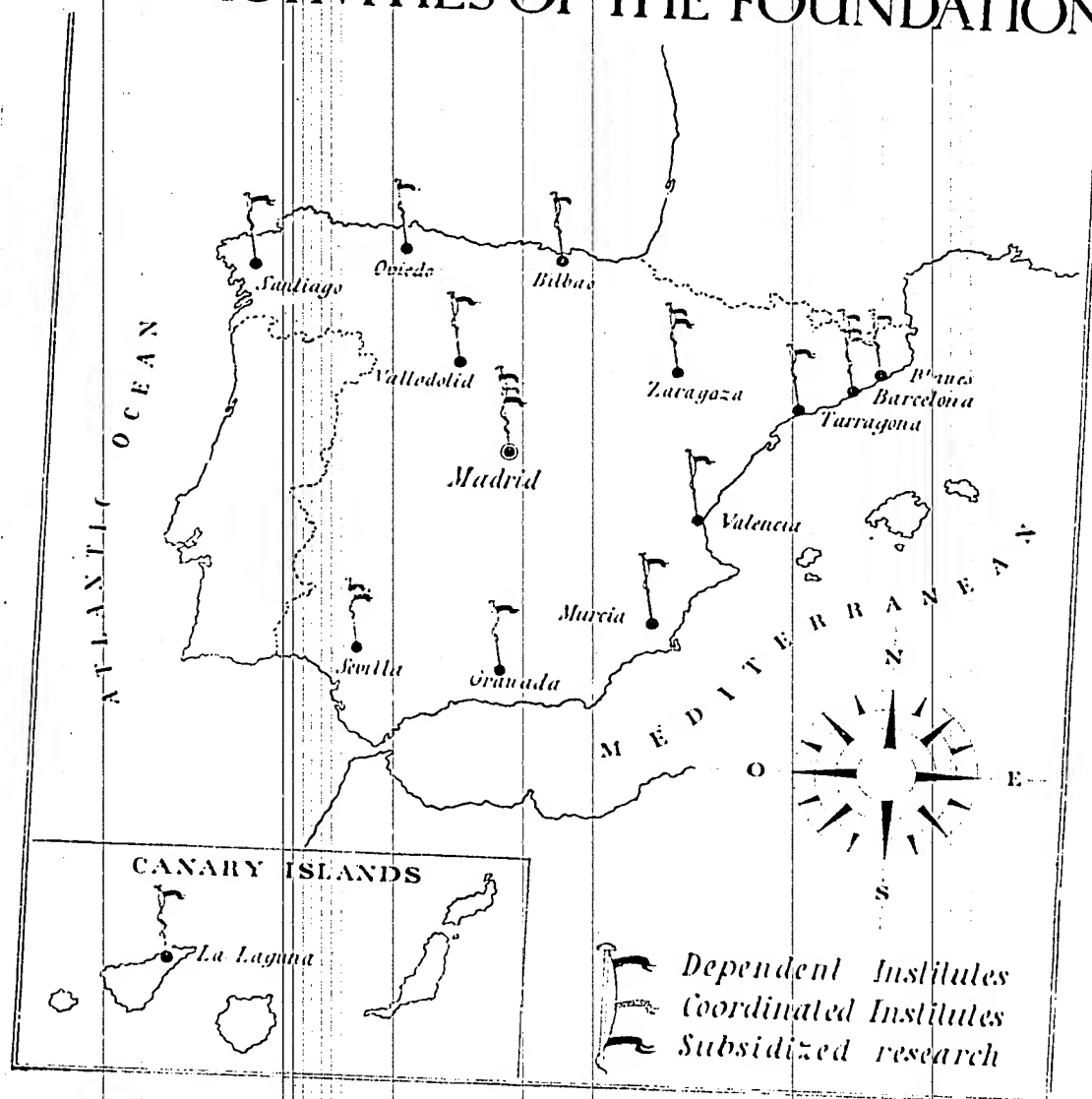
DIVISION OF MARINE BIOLOGY. The incorporation into the JUAN DE LA CIERVA Foundation of the Marine Biology Division of the Barcelona Institute of Applied Chemistry dates from July 1948. Research Stations will be established in Blanes (Gerona), Cádiz and on the coast of Galicia. The Division has started with a course on "Introduction to the Study of Fishery Research". In this course planktology with its relation to the gastric content of fish, biology and statistics concerned with the species most commonly found in Spanish waters will be fully dealt with.

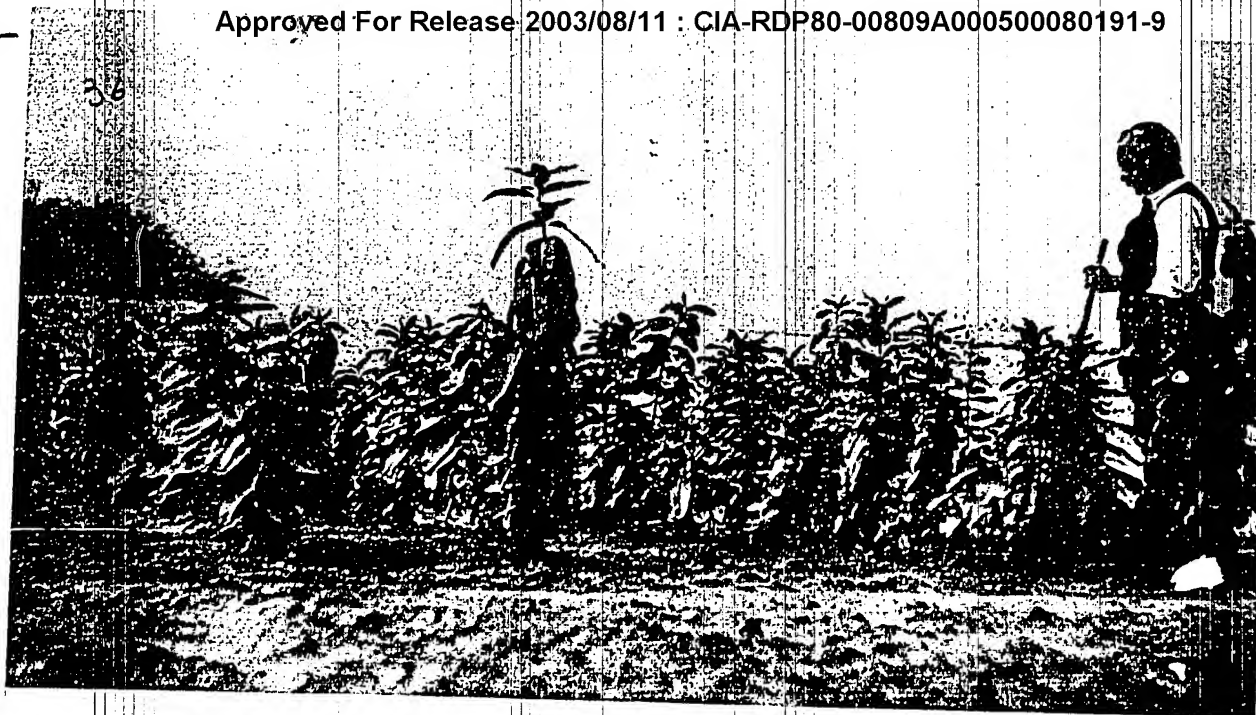
BARCELONA INSTITUTE FOR TECHNICAL RESEARCH.—Urgel, 187. Barcelona.

This centre, which is classified as a coordinated Institute, depends of the provincial administrative authorities of Barcelona. It is made up of the following sections: Cement, Chemistry, Electricity and Metallurgy, Metallography and Esparte Cellulose. The Cement and Concrete Section has inaugurated a series of studies on those matters related to its particular field of activities. The most noteworthy are: a) The corrosion of cements by aggressive waters; b) The measurement of the moduli of elasticity by the

GEOGRAPHICAL DISTRIBUTION OF THE ACTIVITIES OF THE FOUNDATION

35



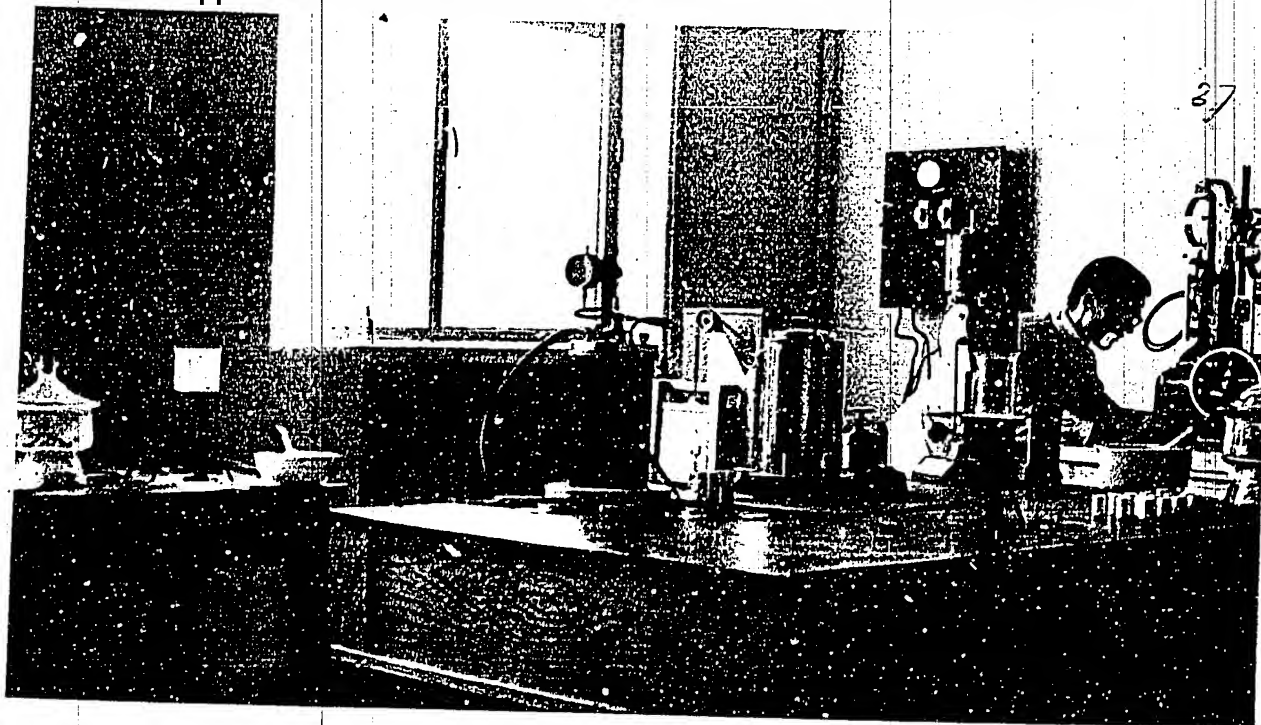


Celestino Muro's Institute of Technology
Research on rubber yielding plants

indirect method of synchronized pendula; e) The purification of water by cement; d) The study of cement hardeners to increase the resistance of cement to friction.

The activities of the Chemistry Division are centered on the study of the exploitation of Spanish aluminium ores and the solution of different problems facing the Cement Division. It has now undertaken research on the obtention from phosphates of the halides of phosphorus and that of ethylene oxide by the catalytic oxidation of ethylene.

The Electricity Division is constructing an acyclic generator of 56 Kw, 8,000 A, 7 V, and 2,900 r.p.m., to collect high intensity electric currents with the minimum of waste. This machine possesses distinctive characteristic: it does not need magnetic copper or aluminium armature plates. This division



Institute for Soil Research
A corner of the Silicates Laboratory

has also produced a dilatometer to measure the coefficient of expansion of ceramics with very satisfactory results.

The Metallurgical Division, recently created, has begun studies on •S curves•, •Susceptibility to temper•, •Determination of austenitic grain in steels• and other subjects.

The Cellulose Division has initiated investigations from an analytical point of view on esparte grass.

INSTITUTE FOR FORESTRY RESEARCH AND EXPERIMENTATION.
Núñez de Balboa, 5. - Madrid.

The bases for the coordination of the work of this Institute with the

38

JUAN DE LA CIERVA Foundation have recently been agreed upon. Research on cellulose, cork, resins and wood-preservation will begin at once.

GENERAL INSTITUTES OF THE HIGHER COUNCIL FOR SCIENTIFIC RESEARCH INTERESTED IN TECHNICAL RESEARCH.

The Coordinating Board of the Alfonso el Sabio, Alonso de Herrera and JUAN DE LA CIERVA Foundations have come to an agreement whereby the facilities of the General Institutes of the Higher Council for Scientific Research may be employed in the pursuit of technical research.

The following studies are now in progress:

- Study of Soil Dynamics • (School of Agricultural Engineers).
- Native Raw Materials in the Production of Furfural • and • Elimination of the Iron Contained in Sands Employed in Glass Manufacture • (Antonio de Gregorio Rocasolano Institute of Physical Chemistry).
- Ceramics of Steatite • and • Spanish Bentonites • (Institute for Soil Research).
- Optical calculation and design • (Daza de Valdés Optical Institute).
- Insect Pests in the Forestry Reserves • (Institute of Entomology).
- Research on Phytohormones • (Alonso Barba Institute).
- Research on Rubber Bearing Plants • (Celestino Mutis Institute of Pharmacognosy).

The erection of the Experimental Biological Station at Cogulada, Zaragoza, is a recent development.

CONSEJO
SUPERIOR DE
INVESTIGACIONES CIENTIFICAS

PATRONATO
"JUAN DE LA
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